

Mortality in mental hospital patients is analyzed in an exploration of its relation to changes in the general pattern of mortality.

Mortality in State Mental Hospitals of Michigan, 1950-54

GEORGE K. TOKUHATA, Ph.D., and VERNON A. STEHMAN, M.D.

MODERN science has not only extended average life but also has markedly affected the pattern of mortality in the United States. The effect of demographic factors associated with mental patients on an overall mortality rate and the trends and characteristics of mental hospital mortality have become subjects of interest and curiosity among professional investigators in the mental health field, including demographers (1-5).

The present study compares differential mortality rates among resident patients in Michigan State mental hospitals with those in the general population of Michigan during a 5-year period beginning in 1950. The source for the data on mortality of mental patients is the statistics section of the Michigan Department of Mental Health. Figures for the general population of Michigan for 1950 are from the United States census. To compute death rates, the number of resident patients and the number of people in communities as of June 30 were used as denominators. Analyses and discussions of the data are presented in the following order. First, age-sex composition of the population in order to provide the basic information that would facilitate intelligent discussion of the differential mortality rates observed in two different environments. Second, trends and characteristics of the mortality rates by all

causes of death. Third, trends and characteristics of the mortality rates by selected causes of death. Fourth, diagnosis-specific death rates among patients with different mental disorders. Fifth, psychiatric hospital mortality from the point of view of physical condition and age of patients on admission to the hospital.

Population Characteristics and Deaths

It is estimated that, during the 1950-54 period under study, Michigan's total population increased from 6,371,766 to 7,156,481, or by 12.3 percent. During this period total deaths in Michigan increased from 57,743 to 60,632 or by 5 percent. These changes led to a shift in the crude death rate, which declined from 9.1 to 8.6 per 1,000 of the State population.

In contrast, the number of resident patients in Michigan State mental hospitals increased from 18,738 to 20,031, or by 6.5 percent, while the number of deaths occurring in the hospitals during the same period decreased from 1,455 to 1,348, or by 7.4 percent. This brought about a sharp decline in the crude death rate for the patients from 77.6 in 1950 to 67.2 in 1954.

Examination of the available data indicates that patient movement during the quinquennium has shifted toward the hospitalization of increasingly more women than men in the middle and old age groups. Conversely, there has been increasingly more men than women of young ages in the hospitals for psychiatric treatment.

Dr. Tokuhata is research sociologist, and Dr. Stehman is deputy director, Michigan Department of Mental Health, Lansing.

Comparison of the general population with the patient population points up two obvious distinctions in the age composition. In the patient population there is an actual and proportionate preponderance in the middle and old age groups, with an extremely small number and proportion of people under 20 years of age, while in the general population, the largest proportion and number is in the youngest age group with a diminishing proportion as the age groups advance. On the other hand, the psychiatric hospital population usually consists of a large proportion of two distinctive diagnostic groups, namely, the schizophrenic patients who are mostly in the productive age groups, and the patients suffering from psychoses associated with senility.

Crude Death Rates by All Causes

The crude death rate, measured as the number of deaths per 1,000 of the total population, usually cannot be taken as an accurate index of the true mortality of the population. However, analyses and discussions of such rates are presented because of their pragmatic utility for health authorities.

Although the hospital population experienced a considerable decrease in the overall death rate, the data reveal no clear-cut and consistent pattern of change. It should be noted, however, that such an overall rate decline was actually accounted for by a remarkable drop in the rate of male patients during this period. Thus, it follows that, although male patients are gener-

ally subjected to a higher mortality than female patients, the death rate difference between the two sexes became continuously less important. On the basis of the 5-year average, approximately 20 more male than female patients per 1,000 died in the course of 1 year.

According to the data in table 1, the magnitude of decrease in the death rate is positively related to the age of the group. Particularly noted are the patients aged 65 and over, who recorded the sharpest decline, from 197.9 to 172.8, a drop of more than 25 deaths per 1,000. With male patients the death rate declined more in the older group than in the younger group, while the reverse was true with female patients, who showed a sharper rate drop in the younger group.

In sharp contrast to what was observed in the hospital population, the general population on the whole did not show a noticeable change in the crude death rate during the period being observed. In fact, in the general population the overall death rate for all causes remained almost unchanged at the level of 10-11 per 1,000. As expected, the male population as a whole always maintained a slightly higher rate of mortality than did the female population. On the 5-year average approximately four more men than women per 1,000 died yearly. Furthermore, both sexes managed to hold a fairly consistent relative position of the rate throughout the entire quinquennium.

The data in table 2 also reveal that the crude death rate for all causes in the general population declined steadily, but slightly, in each of

Table 1. Crude death rate by all causes per 1,000 resident patients, by three broad age groups and sex, 1950-54

Year	Rate by sex			Rate by sex and age group								
				Total			Male			Female		
	Total	Male	Female	15-34	35-64	65 and over	15-34	35-64	65 and over	15-34	35-64	65 and over
1950.....	77.7	93.6	62.2	15.2	38.0	197.9	15.4	47.7	248.1	15.1	28.2	154.3
1951.....	83.8	91.3	76.5	15.6	37.4	221.6	17.8	40.7	247.9	13.4	34.0	197.6
1952.....	71.6	81.2	62.2	12.6	31.6	188.0	14.5	38.0	214.7	10.6	25.2	163.8
1953.....	73.8	85.9	62.2	11.2	31.9	185.3	13.1	39.1	217.4	9.2	24.9	156.4
1954.....	67.5	74.2	61.1	8.7	29.2	172.8	10.2	33.0	193.6	7.2	25.5	154.3
Average.....	74.9	85.2	64.8	12.7	33.6	193.1	14.2	39.7	224.3	11.1	27.6	165.3

Table 2. Crude death rate by all causes per 1,000 for general population, by three broad age groups and sex, 1950-54

Year	Rate by sex			Rate by sex and age group								
				Total			Male			Female		
	Total	Male	Female	15-34	35-64	65 and over	15-34	35-64	65 and over	15-34	35-64	65 and over
1950.....	11.0	12.8	9.1	1.4	8.9	62.3	1.7	11.1	69.7	1.1	6.6	55.2
1951.....	11.1	12.8	9.3	1.3	8.8	61.8	1.6	10.9	68.5	1.0	6.6	55.4
1952.....	10.9	12.7	9.1	1.3	8.7	58.8	1.7	10.8	65.3	.9	6.4	52.5
1953.....	11.3	13.2	9.3	1.4	8.6	60.7	1.8	10.9	67.7	1.0	6.3	54.0
1954.....	10.9	12.8	8.9	1.2	8.2	57.9	1.6	10.4	64.9	.8	5.8	51.2
Average....	11.0	12.9	9.1	1.3	8.6	60.3	1.7	10.8	67.2	1.0	6.3	53.7

the three broad age groups during the same period. It was found, as in the case of hospital mortality, that the magnitude of a quinquennial rate decline was largest in the oldest age group. Differences in the crude death rates as observed between men and women in the general population seem far less significant than those observed in the hospital population.

In view of the extremely contrasting characteristics of the age-sex composition of the two populations, it was assumed that the crude rate of hospital mortality would far exceed that of general mortality. According to the 5-year average rates, the hospital mortality was found to be 6.8 times as high as the general mortality,

while the difference was slightly greater for the female (7.1 times) than for the male (6.6 times) population. The death rate difference between the two populations was found to be much greater in the young than in the old group.

Age-Sex Specific and Standardized Rates

Examination of the data in table 3 indicates that in both populations the age-specific and age-sex specific death rates rise increasingly with advance in age. The age-sex specific rate is measured as the number of deaths of a given age-sex group per 1,000 of the population of that age-sex group. Similar to Malzberg's

Table 3. Age-specific and age-sex specific death rate per 1,000 of mental hospital population and general population, 1950-54 average

Age group	Age-sex specific death rate and ratio								
	Total			Male			Female		
	Mental hospitals	General population	Ratio	Mental hospitals	General population	Ratio	Mental hospitals	General population	Ratio
20-24.....	16.4	1.24	13.2	18.6	1.70	10.9	13.9	0.80	17.4
25-29.....	11.5	1.32	8.7	12.8	1.67	7.7	10.2	.98	10.4
30-34.....	12.3	1.68	7.3	13.8	2.01	6.9	11.0	1.36	8.1
35-39.....	12.7	2.45	5.2	14.3	2.88	5.0	11.2	2.02	5.5
40-44.....	16.3	3.87	4.2	14.9	4.53	3.3	17.8	3.20	5.6
45-49.....	22.0	6.21	3.5	25.3	7.56	3.3	18.4	4.78	3.8
50-54.....	30.3	9.77	3.1	36.0	12.15	3.0	25.0	7.20	3.5
55-59.....	42.0	14.97	2.8	51.8	19.01	2.7	33.4	10.56	3.2
60-64.....	72.6	22.74	3.2	90.0	28.56	3.2	55.1	16.41	3.4
65-69.....	95.8	33.55	2.9	110.0	41.00	2.7	80.4	25.91	3.1
70-74.....	161.6	49.35	3.3	197.5	58.23	3.4	127.3	40.80	3.1
75 and over.....	301.1	104.73	2.9	376.1	112.99	3.3	248.0	97.62	2.5

Table 4. Standardized death rate per 1,000 for resident patients, by three broad age groups and sex, 1950-54

Year	Standardized ¹ rate by sex			Standardized ¹ rate by sex and age group								
				Total ⁴			Male ⁵			Female ⁵		
	Total ²	Male ³	Female ³	20-34	35-64	65 and over	20-34	35-64	65 and over	20-34	35-64	65 and over
1950-----	39.4	48.8	30.9	15.0	31.7	178.5	15.2	39.0	235.0	14.8	24.3	130.7
1951-----	42.0	47.7	37.0	16.5	30.9	204.2	19.1	33.6	238.6	13.5	28.3	177.3
1952-----	35.3	41.5	29.8	13.2	26.6	170.7	14.7	31.2	204.0	11.8	22.2	142.5
1953-----	35.1	42.8	28.4	13.8	25.5	172.4	16.1	31.0	213.4	11.7	20.4	138.7
1954-----	31.2	36.1	26.8	8.7	23.8	160.4	10.7	26.4	189.9	6.9	21.3	135.5
Average-----	36.6	43.4	30.6	13.4	27.7	177.2	15.2	32.2	216.1	11.7	23.3	144.9

¹ Michigan 1940 population used as standard. ² Rates standardized for sex and age. ³ Rates standardized for age. ⁴ Rates standardized for sex and age in a segment of population. ⁵ Rates standardized for age in a segment of population.

findings (6), the largest relative difference in the age-specific and age-sex specific death rates between hospital and general populations was found in the young (20-24) age group. Most important, these specific rates of resident patients were always higher than those of the general population in every age group used in the table.

The mortality trend observed in the hospitals, as indicated by the standardized death rates, was a steady downward movement. The standardized rate is measured per 1,000 of the selected standard population with the adjust-

ment for age or age and sex. From the point of view of demographic significance, this drop is a remarkable change which took place within a period of 5 years beginning in 1950. There was also a considerable rate difference between the patients of different sexes, with the male patients showing a much greater decrease in adjusted mortality than did female patients during the same period.

In all age groups there was a steady and favorable trend in the adjusted mortality. In comparing the three age groups, it was found that the old age group showed a greater decrease

Table 5. Standardized death rate per 1,000 for general population, by three broad age groups and sex, 1950-54

Year	Standardized ¹ rate by sex			Standardized ¹ rate by sex and age group								
				Total ⁴			Male ⁵			Female ⁵		
	Total ²	Male ³	Female ³	20-34	35-64	65 and over	20-34	35-64	65 and over	20-34	35-64	65 and over
1950-----	11.0	13.0	9.0	1.5	8.5	62.3	1.8	10.4	71.0	1.1	6.4	54.1
1951-----	10.8	12.7	8.9	1.4	8.4	61.7	1.7	10.3	69.6	1.1	6.4	54.1
1952-----	10.4	12.3	8.5	1.4	8.3	58.3	1.7	10.2	66.0	1.0	6.2	50.9
1953-----	10.6	12.6	8.6	1.5	8.2	59.9	1.9	10.3	68.0	1.0	6.1	52.1
1954-----	10.0	12.0	8.0	1.3	7.8	56.8	1.7	9.9	64.9	.9	5.7	49.1
Average-----	10.6	12.5	8.6	1.4	8.2	59.8	1.8	10.2	67.9	1.0	6.2	52.1

¹ Michigan 1940 population used as standard. ² Rates standardized for sex and age. ³ Rates standardized for age. ⁴ Rates standardized for sex and age in a segment of population. ⁵ Rates standardized for age in a segment of population.

in the mortality rate than did the middle and young age groups.

In terms of adjusted mortality rate, it should be noted that the amount of improvement made by the young female patients was about twice that experienced by young male patients during the 5 years. In contrast, the pattern of such progress was reversed for the male patients in the middle and old age groups. In general the improvement on life expectancy of male patients was much greater than that of the female patients, with a consequent decreasing sex difference in the mortality rate among resident patients.

In short, it is apparent upon examination of the standardized death rates presented in the table that the downward movement of the mortality observed in State mental hospitals was not due to change in age-sex composition of the resident patient population. Rather it was because of the favorable impact of other environmental factors, or such factors as selective intake of patients so that the patients admitted in later years had a smaller risk of death, or to improvement in therapy which enabled patients to accept improved diets, thus improving their health.

In a 5-year comparison of the two popula-

tions, the adjusted hospital mortality rate was found to be 3.6 times as high as the adjusted general mortality rate (table 5), while no overall sex difference was noted. The greatest adjusted rate difference was found in the group aged 20-34 years, although such a discrepancy became consistently smaller during this period.

Crude Cause-Specific Rates

For the purposes of this paper, the definition of a cause of death, taken from the Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, is "the morbid condition or disease process, abnormality, injury or poisoning leading directly, or indirectly, to death." A systematic classification of the causes of death as tabulated in the detailed list of the International List of Causes of Death was used in this study, and discussion of the basic mortality characteristics and trends is limited to the 12 leading causes of death. The cause-specific rate is measured as the number of deaths from a given disease per 100,000 of the total population.

The causes of death for patients in State mental hospitals show striking variations when compared with those for the general population.

Table 6. Percentage distribution of deaths by 12 leading causes for hospital population and general population, 1950-54

Major causes of death	Hospital population					General population				
	1950	1951	1952	1953	1954	1950	1951	1952	1953	1954
Tuberculosis (001-008, 010-019)-----	3.8	4.1	2.6	2.9	1.9	2.2	1.9	1.3	0.9	0.9
Syphilis (020-029)-----	.3	.3	.2	.5	.7	.8	.5	.3	.3	.2
Malignant neoplasms (140-205)-----	4.3	3.1	4.2	4.9	5.8	15.4	15.9	15.9	16.2	16.9
Diabetes mellitus (260)-----	.1	.2	.5	.3	.6	2.6	2.4	2.3	2.3	2.5
Vascular lesions (330-334)-----	8.4	10.5	10.4	12.3	18.1	11.1	11.1	11.1	11.3	11.3
Arteriosclerotic and degenerative heart disease (420-422)-----	33.4	30.6	37.7	32.9	25.5	27.7	28.4	28.0	29.1	29.7
Hypertension (440-447)-----	1.4	1.9	4.8	4.9	1.8	5.6	5.3	5.4	5.2	4.9
Pneumonia (490-493)-----	16.2	16.9	17.4	15.5	15.8	2.0	2.3	2.3	4.7	2.0
Cirrhosis of liver (581)-----	.4	.1	.2	.5	.3	1.1	1.0	1.0	1.2	1.1
Nephritis and nephrosis (590-594)-----	2.1	2.2	1.7	1.4	.5	1.8	1.7	1.5	2.7	1.2
Suicide and self-inflicted injury (970-979)-----	.6	.5	.2	.2	.2	1.3	1.1	1.2	1.2	1.2
Accidental deaths (800-802, 810-835, 840-965, 980-984)-----	.4	.5	.5	1.5	.7	7.1	7.2	7.1	7.5	7.0
Subtotal-----	71.4	70.9	80.4	77.8	71.9	78.7	78.8	77.4	82.6	78.9
Other causes-----	28.6	29.1	19.6	22.2	28.1	21.3	21.2	22.6	17.4	21.1
Total-----	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE: Numbers in parentheses are category numbers of the International Statistical Classification, 1948.

Table 6 shows a percentage distribution of deaths by 12 leading causes for hospital and general populations respectively. In both populations, arteriosclerotic and degenerative heart disease ranked the highest among the 12 leading causes but, in the course of 5 years, the relative importance of heart disease as a cause of death has gradually and significantly decreased in mental hospitals as compared with an opposite trend observed in general communities. This may be partially explained by an increase of the incidence and mortality of vascular lesions affecting the central nervous system among patients, which has actually inflated the proportion by nearly 10 percent during the period covered by this study. While malignant neoplasms rank fourth as a cause of death in the mental hospitals as compared with second in the general population, the crude death rate for this cause among mental patients is greater than that in the general population. Pneumonia, which has become increasingly unimportant as a cause of death in the general population, is still one of the most frequent causes of patient deaths. The concentration of deaths among a few leading causes was much greater

for the hospital population than for general communities.

Table 7 provides the standardized cause-specific death rates per 100,000 of each of the hospital and general populations by sex.

There has been a steady, and general, decline in the importance of tuberculosis as a leading cause of death, although it has consistently maintained a much greater importance in the hospital population. To be specific, the death rate in hospitals dropped from 293.4 to 116.2 in the course of 5 years, while in communities it declined from 27.2 to 11.1. In general, the mortality rate of this disease was considerably higher for men than for women. However, the rate difference between the two sexes was not as distinct in the hospital population as in the general population. Syphilis and its sequelae were relatively unimportant as a cause of death in both populations, but while the rate declined from 10.5 to 2.9 in the general population, there was a rise from 26.9 to 40.4 among the patients during the 5-year period. This is explained by a sharp rise in mortality from this disease in aged patients, particularly among older male patients.

Table 7. Standardized cause-specific death rate per 100,000 for hospital population and general population by sex, 1950-54 average

[Age group under 20 is excluded]

Cause of death ¹	Standardized ² death rate						Ratio of the hospital death rate to the general death rate by sex		
	Mental hospitals			General population					
	Both sexes ³	Male ⁴	Fe-male ⁴	Both sexes ³	Male ⁴	Fe-male ⁴	Both sexes	Male	Fe-male
Arteriosclerotic and degenerative heart disease.....	895. 4	1, 111. 5	625. 4	333. 1	441. 2	222. 6	2. 7	2. 6	2. 8
Pneumonia.....	552. 2	647. 6	419. 9	17. 6	23. 9	11. 4	31. 4	27. 1	36. 8
Vascular lesions.....	342. 4	372. 6	305. 2	127. 9	130. 5	125. 4	2. 7	2. 9	2. 4
Tuberculosis.....	225. 2	231. 4	149. 4	17. 3	25. 1	9. 2	13. 0	9. 2	16. 2
Malignant neoplasms.....	148. 7	171. 9	144. 5	188. 7	197. 9	181. 2	. 8	. 9	. 8
Hypertension.....	88. 5	99. 2	67. 5	61. 6	58. 1	64. 6	1. 4	1. 7	1. 0
Nephritis and nephrosis.....	48. 2	53. 7	41. 0	17. 4	18. 7	16. 1	2. 8	2. 9	2. 5
Suicide and self-inflicted injury.....	24. 7	28. 2	21. 5	15. 0	23. 6	6. 4	1. 6	1. 2	3. 3
Accidental.....	22. 1	22. 2	21. 8	72. 7	103. 9	41. 3	. 3	. 2	. 5
Cirrhosis of liver.....	12. 2	8. 1	16. 8	13. 5	17. 3	9. 6	. 9	. 5	1. 8
Syphilis.....	10. 0	15. 2	5. 1	5. 1	7. 6	2. 6	2. 0	2. 0	2. 0
Diabetes mellitus.....	5. 5	4. 1	6. 7	27. 8	21. 7	34. 0	. 2	. 2	. 2

¹ See table 6 for full title of cause. ² Michigan 1940 population used as standard. ³ Rates standardized for age and sex. ⁴ Rates standardized for age.

The mortality rate for malignant neoplasms was generally higher in the hospitals than in the general communities, but the difference was not particularly remarkable. For example, the rate differential was 339.1 to 202.0 in 1950 and 368.7 to 222.2 in 1954. It is noted that while more men than women were dying from cancer in the general population during the entire quinquennium, the opposite pattern was developing toward the end of the period in the hospital population where female patients finally exceeded male patients in mortality rates from this disease. This increase in the importance of cancer as a cause of death among female patients seems worth special attention. The death rate for women in the 35-64 age group decreased fairly steadily in general communities, but rose rapidly in the mental hospitals' female population. In the general population there was an extraordinarily high cancer mortality rate for the aged group. It should be noted that the death rate for the general population not only exceeded that for the patient population, but also increased rapidly during the course of 5 years.

Diabetes mellitus is the one cause of death studied which was considerably more prevalent in the general population than inside the hospitals. For instance, the rates were 34.0 and 10.8 respectively in 1950. This difference was clearer and more consistent for the old age group. However, during the period of the study, the hospital death rate from diabetes showed a gradual rise from 10.8 to 35.4 which seems to be indicative of an increasing importance of this disease among mental patients. This increasing trend was almost exclusively accounted for by the female patients, particularly those in the older group.

Vascular lesions affecting the central nervous system caused a high mortality in both populations, although the mental hospitals had much higher rates than the communities, regardless of age and sex differences. During the quinquennium there was a very conspicuous rise in this disease as a cause of death in the hospital population, an increase in the rate from 656.7 to 1,146.4, but the rate remained relatively stable at the level of 150 in general communities.

Arteriosclerotic and degenerative heart disease was the most outstanding cause of death

commonly found in both populations. In 1950 the rate was 2,616.1 in hospitals and 372.1 in the general population. While there was a rising trend of the mortality from heart disease in the general population, there was a consistent and favorable decrease in the mortality from the same disease in the mental hospitals, particularly among female patients. The excess of male mortality over female mortality from heart disease was a common phenomenon. However, this characteristic was found to be much more distinct in the hospital population than in the general population.

Mortality rates from hypertension with and without heart disease were about twice as high in the hospital population as in the general community. For instance, in 1954 the rates were 116.2 and 65.9 respectively. It is notable that in the community population relatively more women than men were dying from hypertension, particularly in the older age group. In mental hospitals, on the other hand, there was a consistent and rapidly growing trend in mortality from hypertension during the first few years of the period.

It has been mentioned previously that the sharpest difference in mortality rates between the two populations was from pneumonia. On the 5-year average the rate difference was indicated by as high a ratio as 20 to well over 1,000. However, there has been a steady decline in the death rate from pneumonia in the hospital mortality tables, while the mortality in the general population has remained relatively stationary. This is probably a reflection of the improvement in the general medical care of patients in mental institutions.

Cirrhosis of liver was one of the much less important causes of death in both populations. In 1954 only 20.2 and 15.1 persons died of this disease in mental hospitals and general communities respectively. It is also indicated that neither environmental differences nor the differences in demographic characteristics seem to produce an appreciable variance in the mortality from this disease.

A steady decline in the death rate from nephritis and nephrosis was experienced both in the general population and in the mental hospitals, but this trend was much more markedly observed in the latter, where the rate changed

from 166.9 to 30.3, than in the former, where it changed only from 22.4 to 16.1.

Suicide and self-inflicted injury was a much more common cause of death in mental hospitals at the beginning of the quinquennium. The actual rate difference was 43.1 to 16.3 in 1950. However, the death rate difference became almost negligible toward the end of the period as the patient deaths from this cause gradually declined. This was almost entirely due to a decrease in suicide among male patients, in which group the death rate actually dropped to less than one-third of the 1950 record. Thus, at the end of the quinquennium, the death rate for men in the general community became considerably higher than that for men in the hospital population. Suicide and self-inflicted injury was a much more prevalent cause of death among people in the productive ages than those in other ages.

The accidental death rate was much lower in the hospital population than in the general population. In 1950, for instance, there were 26.9 per 100,000 accidental deaths in hospitals while 77.1, or three times as many, deaths per 100,000 were caused by accidents outside hospitals. However, there was a general rising trend in the mortality among patients, particularly among female patients.

Standardized Cause-Specific Rates

Having eliminated the influence of age-sex composition of a population, the standardized 5-year average rates provide a better basis for comparison of the mortality from specific causes between hospital and general populations, as well as between men and women of each population. The standardized cause-specific death rates for each of the two populations are ranked in the following order:

Hospital

- | | |
|--|--------------------------------------|
| 1. Arteriosclerotic and degenerative heart disease | 7. Nephritis and nephrosis |
| 2. Pneumonia | 8. Suicide and self-inflicted injury |
| 3. Vascular lesions | 9. Accident |
| 4. Tuberculosis | 10. Cirrhosis of liver |
| 5. Malignant neoplasms | 11. Syphilis |
| 6. Hypertension | 12. Diabetes mellitus |

General

- | | |
|--|---------------------------------------|
| 1. Arteriosclerotic and degenerative heart disease | 7. Pneumonia |
| 2. Malignant neoplasms | 8. Nephritis and nephrosis |
| 3. Vascular lesions | 9. Tuberculosis |
| 4. Accident | 10. Suicide and self-inflicted injury |
| 5. Hypertension | 11. Cirrhosis of liver |
| 6. Diabetes mellitus | 12. Syphilis |

The death rates from two different causes, pneumonia and tuberculosis, showed a marked difference between the two populations. The age-sex adjusted rate from pneumonia was approximately 30 times as high in the hospital as in the general population, while the rate from tuberculosis was 13 times as high in the hospital as in the general population. The adjusted rate from heart disease, vascular lesions, hypertension, nephritis and nephrosis, suicide, and syphilis was about twice as high for the patients as for the people in the community. Conversely, cancer, accident, diabetes mellitus, and cirrhosis of liver were found to be less important among the patients.

The data further indicate that the spread between highest and lowest cause-specific death rates was much smaller for the general population than for the hospital population. The adjusted mortality rates were always higher for men than for women excluding diabetes mellitus in both places, cirrhosis of liver in the hospital, and hypertension in the community.

Rates by Psychiatric Diagnosis

Of somewhat different significance from the cause-specific death rate was the death rate as it relates to psychiatric diagnosis. The diagnosis-specific rate is measured as the number of patient deaths with a given psychiatric diagnosis per 1,000 patients with the same diagnosis. The number and percentage distribution of resident patients and deaths by diagnosis (7) and sex and the diagnosis-specific death rates for 1955 are presented in table 8. (Because of the availability of data, 1955 was used for the data analyzed in table 8. Death rates computed in this table can be treated as proportions amenable to the statistical test for the significance of the difference. However, in view of small numbers in some diagnostic categories, the sampling distribution of the difference between

Table 8. Number and percentage distribution of resident patients and deaths, by diagnosis and sex, and diagnosis-specific death rate, 1955

Diagnosis by sex	Patients		Deaths		Death rate per 1,000
	Number	Percent ¹	Number	Percent ¹	
<i>Both sexes</i>					
Acute brain disorders-----	84	0.4	11	0.8	131.0
Chronic brain disorders-----	2,693	13.2	209	14.3	77.6
Disorders of the senium-----	2,253	11.1	813	55.7	360.9
Involuntional psychoses-----	442	2.2	32	2.2	72.4
Manic-depressive psychoses-----	773	3.8	50	3.4	64.7
Schizophrenia-----	11,792	57.9	252	17.3	21.4
Psychoneurotic disorders-----	239	1.2	11	.8	46.0
Personality disorders-----	440	2.2	13	.9	29.5
All others-----	1,660	8.1	69	4.7	41.6
Total-----	20,376	100.0	1,460	100.0	71.7
<i>Male</i>					
Acute brain disorders-----	65	.7	6	.7	92.3
Chronic brain disorders-----	1,745	17.6	118	15.6	67.6
Disorders of the senium-----	1,045	10.5	409	54.2	391.4
Involuntional psychoses-----	134	1.4	19	2.5	141.8
Manic-depressive psychoses-----	267	2.7	17	2.3	63.7
Schizophrenia-----	5,404	54.5	134	17.7	24.8
Psychoneurotic disorders-----	101	1.0	6	.8	59.4
Personality disorders-----	316	3.2	8	1.1	25.3
All others-----	832	8.4	38	5.0	45.7
Total-----	9,909	100.0	755	100.0	76.2
<i>Female</i>					
Acute brain disorders-----	19	.2	5	.7	263.2
Chronic brain disorders-----	948	9.1	91	12.9	96.0
Disorders of the senium-----	1,208	11.5	404	57.3	334.4
Involuntional psychoses-----	308	2.9	13	1.8	42.2
Manic-depressive psychoses-----	506	4.8	33	4.7	65.2
Schizophrenia-----	6,388	61.0	118	16.7	18.5
Psychoneurotic disorders-----	138	1.3	5	.7	36.2
Personality disorders-----	124	1.2	5	.7	40.3
All others-----	828	7.9	31	4.4	37.4
Total-----	10,467	100.0	705	100.0	67.4

¹ Percentages, rounded, may not add to 100.

proportions may not approximate normality.)

Diagnostic groupings in this study were developed to provide homogeneity of categories and also to use the experience in hospitals which has indicated meaningful subgroups. Since the mortality data were not available by age and sex for each diagnosis, the following discussions are based upon the crude death rates without control for the age-sex variation of the patient groups with different diagnoses.

More than 80 percent of the 20,376 patients residing in State mental hospitals in 1955 were included in three diagnostic classes, with 57.9 percent diagnosed as schizophrenic; 13.2 percent diagnosed as chronic brain disorders; and 11.1 percent diagnosed as disorders of the senium. The degree of concentration just mentioned was found to be somewhat higher among male patients than among female patients, although a considerably larger proportion, 61.0 percent, of female patients than of male patients, 54.5 percent, belonged to the schizophrenic group. There were about twice as many males as females with chronic brain disorders.

The pattern of diagnosis-specific death rates appeared to be quite different from that of cause-specific death rates. First, the range between highest and lowest rates by diagnosis was found to be much smaller than that by cause of death. Second, resident patients can easily be dichotomized, in terms of crude death rate, into the high- and the low-risk groups respectively. The high-risk groups for both sexes consisted of those with disorders of the senium and those with acute brain disorders. This was also true when female patients were considered individually, but when male patients were so considered, those with disorders of the senium and those with involuntional psychoses actually constituted the high-risk group. Within the low-risk group the variation of death rate was not great.

The highest death rate, 360.9 per 1,000 was found for the group of patients having a diagnosis commonly associated with advanced age, that is, disorders of the senium. The second highest, 131.0 per 1,000, was for the group with acute brain disorders, but when male patients were considered separately the group with involuntional psychoses ranked second highest,

Table 9. Mean age of resident patients, by diagnosis and sex, 1955

Diagnosis	Mean age and sex		
	Both sexes	Male	Female
Acute brain disorder.....	56.3	56.5	55.8
Chronic brain disorder.....	54.3	54.5	54.0
Disorders of the senium.....	75.4	73.8	76.8
Involuntional psychoses.....	63.2	64.5	62.6
Manic-depressive psychoses.....	62.0	62.5	61.7
Schizophrenia.....	49.1	48.4	49.6
Psychoneurotic disorders.....	51.4	45.2	55.8
Personality disorders.....	44.8	44.8	44.8
All others.....	53.8	52.4	55.3
Total.....	56.7	55.8	57.4

141.8 per 1,000. For other diagnostic groups used in this analysis the rates were always less than 100 and ranked in the following order: chronic brain disorders, involuntional psychoses, manic-depressive psychoses, psychoneurotic disorders, all others, personality disorders, and schizophrenia. The psychotic group with relatively low death rates were those with the so-called functional disorders without known physical basis. For example, the schizophrenic group had the lowest death rate, 21.4 per 1,000, regardless of sex difference. As against the usual pattern, relatively more female patients than male patients diagnosed as either chronic

brain disorders, manic-depressive psychoses, or personality disorders died in 1955.

Physical Condition, Age, and Diagnosis

While the physical condition of a patient on admission cannot be assumed to remain constant during hospitalization, it still is the best available estimate of the importance of physical explanations for the generally high mortality rate of psychiatric patients. The information is provided by the admitting physician and is classified as "good," "fair," "poor," or "critical."

The mean age of resident patients by diagnosis and sex, and the physical condition of patients on admission by diagnosis, were examined together to account for some of the basic differences in the diagnosis-specific mortality rate (tables 9 and 10). Spearman's rank order correlation (8) between diagnosis-specific death rate and percentage of patients with "good" physical condition on admission substantiates a significant relationship between them ($r_s = -0.900$; $P < 0.001$). That is, the greater the percentage of patients with "good" physical condition the lower the death rate. An extremely high death rate for the senile psychoses was well supported by the fact that not only the mean age of this group was high but also a large proportion of the group had a "subnormal" physical condition on admission

Table 10. Percentage distribution of all admissions and admissions for selected age group, by diagnosis, and percentage distribution of admissions for selected disorder, by patients' physical condition, 1955

Diagnosis	All ages ¹	Age group			Physical condition				
		20-44	45-64	65 and over	Total ¹	Good	Fair	Poor	Critical
Acute brain disorders.....	1.8	2.3	2.2	0.5	100.0	58.4	28.6	10.4	2.6
Chronic brain disorders.....	10.0	7.0	18.1	6.8	100.0	29.4	47.7	18.2	4.7
Disorders of the senium.....	20.4	.1	10.6	80.4	100.0	14.8	35.2	38.9	11.1
Involuntional psychoses.....	3.7	.3	12.0	1.6	100.0	61.5	33.5	3.7	1.3
Manic-depressive psychoses.....	4.0	2.6	7.5	3.4	100.0	53.8	40.4	5.3	.5
Schizophrenia.....	42.2	65.2	32.8	4.5	100.0	74.5	21.4	3.6	.5
Psychoneurotic disorders.....	4.5	5.8	4.0	1.7	100.0	70.8	25.1	4.1	0
Personality disorders.....	11.6	14.4	11.1	1.0	100.0	75.5	22.1	2.0	.4
All other.....	1.8	2.3	1.7	.1	100.0	71.4	19.5	7.8	1.3
Total.....	100.0	100.0	100.0	100.0	100.0	56.1	28.4	12.4	3.1

¹ Including 19 and under.

NOTE: Because of the availability of data, 1955 was used for analysis.

identified as either "fair," "poor," or "critical." For example, 11.1 percent of those with disorders of the senium were identified as "critical" at the time of admission to the hospitals.

In contrast, the lower mortality rates for the schizophrenic group and for the group with personality disorders can be explained by the low mean age of each group and also by "good" physical condition of those patients on admission. The relatively high death rates in the diagnostic categories of acute brain disorders, chronic brain disorders, disorders of the senium, involutional psychoses, and manic-depressive psychoses coincide remarkably with the fact that each of these groups had a relatively high mean age as well as a relatively large proportion with "subnormal" physical condition at the time of admission.

It should be noted that as high as 43.9 percent of all patients admitted to State mental hospitals in 1955 were physically identified as either "fair," "poor," or "critical." This seems to be one of the most significant factors explaining the high mortality rate in mental hospitals as compared with the low mortality rate prevalent in the general communities.

The physical condition of the patient on admission was found to be closely related to the patient's age on admission. That is, the higher the age of the patient group the smaller the proportion having "good" physical condition. Spearman's rank correlation coefficient ($r_r = -0.835$; $0.01 > P > 0.001$) supports this generalization. The patient group between the ages of 20 and 44 at the time of admission had 75.7 percent classified as in "good" physical condition while only 17.3 percent of the patients aged 65 and over at the time of admission were so classified.

Summary and Conclusion

The interpretations and generalizations presented in the present study are based on data collected in Michigan for the 1950-54 period. The following conclusions appear to be of significance.

1. The mental hospital population was over-represented by the middle and old age groups as compared with the State population.

2. The hospital mortality rate was more var-

iable and unstable than the general mortality rate.

3. In terms of crude rate the overall hospital mortality was 6.8 times as high as the overall general mortality.

4. When the rates were adjusted for age and sex, the overall hospital mortality was 3.6 times as high as the overall general mortality.

5. The quinquennial decline in the death rate was much greater in the hospital population than in the general population, thus narrowing the rate discrepancy between the two.

6. The quinquennial decline in the death rate was much greater among older people, particularly among older men, in both populations.

7. The sex difference in death rate was much greater in the hospital population than in the general population.

8. The hospital death rate was always higher than the general death rate in each age-sex specific group.

9. The relative importance of each of the 12 leading causes of death was manifested differently in the two different populations. The two most frequent causes of death in the hospital population were arteriosclerotic and degenerative heart disease and pneumonia, while those in the general population were arteriosclerotic and degenerative heart disease and malignant neoplasms.

10. The age-sex adjusted mortality rates from pneumonia and tuberculosis were approximately 30 times and 13 times as high in the hospital as in the general population respectively.

11. Malignant neoplasms, accidents, cirrhosis of liver, and diabetes mellitus were found to be less important for the hospital population than for the general population.

12. The high mortality group of the patients consisted of those with senile psychoses and those with acute brain disorders.

13. The psychotic group with relatively low death rates were those with functional disorders such as schizophrenia.

14. A statistical analysis substantiated a consistent, positive relationship among death rate, patient age, and the proportion of patients with "subnormal" physical condition on admission to the hospital.

Although the present investigation is largely descriptive in nature, it is hoped that the results

will have not only heuristic value but will also be productive of a series of hypotheses in regard to the dynamics of differential mortality among hospitalized psychiatric patients.

REFERENCES

- (1) Malzberg, B.: Cohort studies of mental disease in New York State, 1943 to 1949. *Ment. Hyg.* 40: 450-479, July 1956.
- (2) Fuller, R.: Expectation of hospital life and outcome for mental patients on first admission. *Psychiatric Quart.* 4: 295-323, April 1930.
- (3) Kramer, M., Goldstein, H., Israel, R. H., and Johnson, N. A.: A historical study of the disposition of first admissions to a State mental hospital. Public Health Service Pub. No. 445, Public Health Monogr. No. 32. Washington, D. C., U. S. Government Printing Office, 1955.
- (4) Sartwell, P. E., and Merrell, M.: Influence of the dynamic character of chronic disease on the interpretation of morbidity rates. *Am J. Pub. Health* 42: 579-584, May 1952.
- (5) Dorn, H. F., and Cutler, S. J.: Morbidity from cancer in the United States. Public Health Service Pub. No. 418, Public Health Monogr. No.

29. Washington, D. C., U. S. Government Printing Office, 1955.

- (6) Malzberg, B.: Mortality among patients with mental disease. Utica, N. Y., State Hospitals Press, 1934.
- (7) American Psychiatric Association Committee on Nomenclature and Statistics: Diagnostic and statistical manual [for] mental disorders. Washington, D. C., Mental Hospital Service, Am. Psychiatric Assn., 1952.
- (8) Hagood, M. J., and Price, D. O.: Statistics for sociologists. Rev. ed. New York, N. Y., Henry Holt and Co., 1952.

DOCUMENTATION NOTE

An additional table showing the cause-specific death rate per 100,000 for hospital and general populations, by sex, for the 5 years 1950-54, has been deposited as document No. 5565 with the American Documentation Institute Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington 25, D. C. A photoprint may be obtained by remitting \$1.25; a 35-mm. microfilm copy by remitting \$1.25. Advance payment is required. Cite document number. Make check or money order payable to Chief, Photoduplication Service, Library of Congress.

Syphilis Serology Courses

Eight laboratory courses will be offered at the Venereal Disease Research Laboratory of the Public Health Service in Chamblee, Ga., September 1958 through May 1959, according to the following schedule:

Serology of syphilis. September 8-19; December 1-12; February 9-20; April 6-17.

Tests for syphilis using treponemal antigens. October 6-17; March 9-20.

Fluorescent antibody techniques in the diagnosis of the venereal diseases. March 23-27.

Control of syphilis serology by the regional laboratory. May 4-15.

The four refresher courses in serology of syphilis will consist of lecture, demonstration, and participation periods covering the most widely used nontreponemal procedures in addition to supplemental methods. Special reference will be made to the latest developments, such as the Kolmer test with Reiter protein antigen, the TPCF test, and the use of a stabilized antigen emulsion in the VDRL tests.

The two courses in the treponemal antigen tests for syphilis are designed for senior staff members. The course in fluorescent antibody

techniques will cover the performance of the fluorescent treponemal antibody test, with instruction in the use of ultraviolet microscope assemblies. Instruction in the identification of *Neisseria gonorrhea* and *Hemophilus ducreyi* will include antibody preparation, fluorescein-labeling, and preservation. The course in control of syphilis serology by the regional laboratory, designed for laboratory directors and senior staff members, includes review of national and statewide serologic evaluation programs, laboratory visits, and field workshop procedures, together with discussion and demonstration of new procedures.

Applications must be approved by a State health officer or State laboratory director, by the medical officer in charge or a Federal agency, or by the organization sponsoring applicants from other countries. Application forms may be obtained from: Director, Venereal Disease Research Laboratory, Venereal Disease Branch, Communicable Disease Center, Public Health Service, P. O. Box 185, Chamblee, Ga.

publications

The Nurse in the U. S. Public Health Service

PHS Publication No. 361. Revised September 1957. 24 pages, plus supplement; illustrated.

The story of career opportunities for both clinical and public health nurses in the various nursing programs of the Public Health Service is brought up to date. The booklet describes the work of nurses in Service hospitals, at the Clinical Center of the National Institutes of Health, in Indian health and international health programs, in field research and investigation, in work with States, and in nursing resources activities.

The two personnel systems of the Service, Civil Service and Commissioned Corps, are explained, and methods of applying for various assignments are outlined. A supplement lists requirements for applicants and other detailed employment information.

Patients in Public Hospitals for the Care of the Mentally Ill, 1956-1957

PHS Publication. Mental Health Statistics. Current Reports Series MHB-H-3. December 1957. 8 pages. 5 cents.

Designed to permit early publication of selected statistics for public mental hospital systems in the United States, this report replaces the publications entitled "Patients in Public Hospitals for the Prolonged Care of the Mentally Ill," formerly published in this series, and "Mental Patient Data for Fiscal Year," previously presented in *Public Health Reports*.

Data from two sources are combined. Statistics for 1956 are based on preliminary tabulations of schedules submitted for the 1956 census of mental patients. Those for 1957 are based on estimates obtained in

a special survey of public mental hospitals conducted shortly after the close of the fiscal year. Selected items of patient movement, number of employees at end of year, and maintenance expenditures are shown for each State, with a separation into "all public hospitals" and "prolonged care" for those States having short-term psychopathic hospitals.

National Library of Medicine

PHS Publication No. 507. Revised February 1958. 13 pages.

Library hours, loan procedures, photographic and reference services, translators, history of medicine division, art section, medical motion picture collection, and publications of the National Library of Medicine are described in this booklet.

Uniform Definitions of Home Accidents

PHS Publication No. 577. 1958. 15 pages. 30 cents.

Designed to provide precise meanings of terms in the home accident field, this manual of definitions should prove useful to all personnel engaged in home accident reporting or home accident prevention programs.

To be listed a term must be pertinent to home accident prevention; it must have a special connotation in home accident prevention or a related field (medicine, statistical analysis, engineering, and so forth); and, it should, if possible, indicate a measurable variable. Certain common terms which are subject to misinterpretation are included, but clearly defined common or nontechnical terms found in the average dictionary are omitted.

The definitions were developed by the Conference on Uniform Defini-

tions of Home Accidents that met in Chicago, April 1957, under the sponsorship of the Public Health Service, the American Public Health Association, and the National Safety Council.

Taking Care of Diabetes

PHS Publication No. 567. 1958. 32 pages; illustrated. 20 cents.

Written especially to help the diabetic person and his family develop a better understanding of the disease and its control, this booklet presents salient facts about the physiology of diabetes and the relation of food, exercise, and insulin to its control.

The patient is shown how he can have a wide variety of foods by using the meal plan suggested by his doctor in conjunction with six food exchange lists. The technique used in administering insulin, how to take proper care of injection equipment, and Benedict's test for urine sugar are described.

Emphasis is given to the importance of recognizing symptoms of insulin reaction and onset of diabetic coma as well as the need for the diabetic patient to take proper care of his feet.

Manual for Nutrition Surveys

Interdepartmental Committee on Nutrition for National Defense. 1957. 160 pages. \$1.50.

Methods for conducting nutrition surveys and appraising the nutritional status of a population are presented in this reference and guide. Although the manual is designed primarily for surveys of military forces, the basic approach and methodology are applicable to civilian populations.

The manual is intended to establish uniform methods in collecting data, to provide a reference to insure maximum coverage of the essential facts, and to serve as a guide for interpretation of dietary, biochemical, and clinical data. It also offers guidelines in defining the duties of

various team members and for training local personnel.

The list of necessary supplies and equipment and the chapter on sampling are applicable equally to a single nutrition survey or a permanent nutrition service.

State Personnel in Official and Voluntary Agencies Concerned With Agricultural Migrants

PHS Publication (unnumbered). 1958. 14 pages.

Persons in selected official and voluntary agencies in the States who are officially designated to be contacted on questions regarding agricultural migrants are identified. Representatives of State departments of health and education, the Farm Placement Service of the U. S. Department of Labor, and the Migrant Ministry of the Home Missions Division of the National Council of Churches are listed along with persons named by the governors as liaison with the President's Committee on Migratory Labor in States where there is no official committee.

Copies can be obtained from: Division of General Health Services, Bureau of State Services, Public Health Service, Washington 25, D. C.

Public Exposure to Ionizing Radiations

What Public Health Personnel Need to Know

American Public Health Association. 1958. 55 pages; glossary. \$1.35; orders for 25 or more at a discount.

This pamphlet aims to provide public health employees with simple concepts basic to a radiological health program. The text presents the issues, in perspective. Although it does not deal with physics or with the precise definition or measurement of radiations, it describes the phenomena of radiations and their probable public health effects. Major sources of radiation of concern to public health workers are discussed

as to their benefits and hazards, present and future.

The pamphlet was prepared by a committee of the American Public Health Association with advice and technical assistance from employees of the Public Health Service. Orders should be placed with the American Public Health Association, 1790 Broadway, New York 19, N. Y.

Research and Education in Rheumatic Diseases

Transactions of the Second National Conference

Arthritis and Rheumatism Foundation and the National Institute of Arthritis and Metabolic Diseases of the Public Health Service. 1957. 156 pages.

Texts of papers presented at the conference are assembled in this book under three headings: basic disciplines and promising pathways in research in rheumatic diseases, support currently available for research and training in rheumatic diseases, and the United States Public Health Service graduate training program in arthritis.

Distribution of the publication, now completed, is limited to members of the participating associations, medical libraries, medical schools, and a selected list of rheumatologists. Inquiries concerning availability should be addressed to the Information Office, National Institute of Arthritis and Metabolic Diseases, Public Health Service, Bethesda 14, Md.

Health Statistics From the U. S. National Health Survey

Origin and Program

PHS Publication No. 584-A1. 1958. 36 pages. 30 cents.

Background information on the U. S. National Health Survey, including history, need for health statistics, policies, and program, is presented in this booklet. It is the first

of a series (series A) covering technical and methodological matters relating to the survey.

Appendixes contain the text of the National Health Survey Act (Public Law 652, 84th Congress) and a reprint of recommendations for collection of health data of a subcommittee of the U. S. National Committee on Vital and Health Statistics (PHS Publication No. 333, 1953).

Health Statistics From the U. S. National Health Survey

Preliminary Report on Number of Persons Injured, United States, July-December 1957

PHS Publication No. 584-B3. 1958. 32 pages. 30 cents.

Persons sustaining injuries that caused restriction of their usual activities for at least a day or who were medically attended are included in the estimates. The report contains 26 detailed tables, text tables, and charts presenting breakdowns by age, sex, urban-rural residence, and class of accident. Data are based on nationwide household interviews of a representative sample of the population.

Appendixes provide technical notes on methods and definitions.

Digest of Prepaid Dental Care Plans, 1958

PHS Publication No. 585. 1958. By Walter J. Pelton and Richard W. Bowman. 41 pages.

All known prepaid dental care plans operating in the United States are listed by name, with address, sponsorship, date established, geographic area served, eligibility requirements, and size of enrollment. Information on methods of operation and types of benefits offered is also included.

The plans are grouped into two major categories, plans with regular benefits and those with limited benefits, and are subdivided into four groups: communitywide, union spon-

sorship, employer-employee sponsorship, and fraternal organization sponsorship. The complete dental fee schedules of four of the most comprehensive plans are reproduced in the appendix.

Tuberculosis Beds in Hospitals and Sanatoria, May 1, 1957

PHS Publication No. 518. 1958. By Stanley Glaser and Josephine Johnston. 41 pages. 30 cents.

A listing by State and city, as well as alphabetically, of hospitals and sanatoria in the United States and Territories with five or more beds available for treating patients with tuberculosis is provided. Included are all State, local, private, and Federal institutions except Federal mental and penal institutions. Type of ownership is specified.

Homemaker and Related Services

A Directory of Agencies in the United States

PHS Publication No. 598. 1958. 75 pages.

Name, location, telephone number, type of agency, area served, kind of service provided, year established, number of homemakers employed, and number of families served during a 1-week period are listed.

The directory was compiled from a nationwide survey of homemaker services by the Public Health Service in cooperation with the Children's Bureau and the Bureau of Public Assistance, Social Security Administration.

Strike Back at Stroke

PHS Publication No. 596. 1958. 37 pages; illustrated. 40 cents.

Step-by-step instructions and illustrations are given for 21 therapeutic exercises developed by experts in the field of medical rehabilitative therapy. The booklet also

contains information on how to fix the bed for the patient, how to place the patient in bed, and what to do if the patient cannot speak.

Designed to make it easier for the doctor to show what can be done for and by the stroke victim at home to help minimize the disability that usually follows a stroke, the manual even contains a prescription blank printed below each exercise so that the doctor can specify the frequency and duration of selected exercises.

The Vending of Food and Beverages

PHS Publication No. 546. 1957. 18 pages. 15 cents.

Intended for adoption by municipalities and States, the suggested sanitation ordinance and code contains the recommendations of the Public Health Service. It is published for the guidance of jurisdictions desiring a uniform law based on the best information currently available. The format of the ordinance permits flexibility in adoption or enactment.

The recommendations are based on field studies of current practices in vending machine design, construction, and operation, and a review of existing State and local regulations. They were developed at the request of State and local health authorities and the vending machine industry.

Proceedings of Symposium on Coccidioidomycosis, 1957

PHS Publication No. 575. 1957. 197 pages; illustrated.

Currently available information on the epidemiology, ecology, immunology, pathology, diagnosis, and treatment of coccidioidomycosis, together with the most recent advances in research, is comprehensively reviewed. This material is published for the benefit of investigators everywhere who are attempting to overcome the difficulties in diagnosing, controlling, and treating this disease.

Directory of Medical and Biological Research Institutes of the U. S. S. R.

PHS Publication No. 587. 1958. 340 pages.

More than 700 biological and medical research institutes in the U. S. S. R., with their subdivisions and laboratories, are listed in this directory. Arrangement is geographic, with a subject index. A name index includes more than 1,500 Russian scientists.

The directory is intended as a guide not only for those planning scientific visits or correspondence but also for those studying Soviet medical research.

Extent of Cancer Illness in the United States

PHS Publication No. 547. 1958. 23 pages. 25 cents.

Trends and variation in cancer mortality and incidence, some aspects of diagnosis and treatment, and survival prospects for cancer patients are covered in this well-documented, statistical study of cancer. The booklet is comprised of 31 questions and answers together with 22 charts and 9 tables. It is directed to persons concerned with the course of cancer in individual patients or with its impact on larger population groups.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared by other Federal agencies.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Office of Information, Public Health Service, Washington 25, D. C.

The Public Health Service does not supply publications other than its own.
